

Specification Change Notice (SCN)

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This notice informs recipients that the Specification identified by the number (and revision letter) shown in block 4 has been changed. The pages changed by this SCN (being those furnished herewith) carry the same date as this SCN. The page numbers and dates listed below in the summary of changed pages, combined with nonlisted pages of the original issue of the revision shown in Block 4, constitute the current version of this specification.							
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1	3			X		2/4/91	
	4			X		2/4/91	
	4a				X	2/4/91	
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	44			X		2/4/91	
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16. technical Concurrence <i>Monica J. ...</i> Associate Program Manager for Engineering, ANN-140						17. Date 2/11/91	

● -S" indicates Supersedes Earlier Page; "A" Indicates Added Page

drawing number and date. Requests should cite the **invitation-for-bids**, request-for-proposal, or contract involved or other use to be made of the requested material.)

(Single copies of military specifications and standards may be obtained from Federal Aviation Administration, Washington, D.C. **20590**, **ATTN:** Contracting Officer. Requests should cite the invitation-for-bids, requests for proposals, or contract for which the material is needed. Mail requests, if found acceptable, will be forwarded to a military source of supply for filling; hence, ample time should be allowed. Single copies of military specifications, standards, and publications also may be obtained directly from the Commanding Officer, Naval Publications and Forms Center, **5801 Tabor** Avenue, Philadelphia, Pennsylvania **19120**.)

(Information on obtaining Federal specifications and standards may be obtained from the General Services Administration offices in Washington, D.C.; Atlanta; Boston; Chicago; Denver; Kansas City, Missouri; New York; San Francisco; and Seattle.)

3. REQUIREMENTS

3.1 General.- The **PAR-56** lampholder is part of an elevated low-impact resistant approach lighting system. The types of mountings are depicted on FAA Drawings **D-6071-15** and **D-5870-4**.

3.2 Equipment to be furnished by the contractor.- The equipments to be furnished under this specification are:

- (a) **PAR-56** lampholder assembly (**3.3.1**). Quantities shall be as specified in the contract schedule.
- (b) shorting device assembly (**3.3.2**)
- (c) aiming device (**3.3.3**)

3.3 Functional requirements.- The **PAR-56** lampholder shall secure, in the proper operating position, a **300-watt** or a **500-watt**, **20** ampere (A), **PAR-56** lamp made in accordance with Specification **FAA-E-2408**. The **PAR-56** lampholder shall also secure the color filter screen, FAA Drawing **A-4885-1**, using the color screen holder shown on figure 1. The **PAR-56** lampholder shall be designed for continuous operation under the environmental conditions specified in **3.4**.

3.3.1 PAR-56 lampholder assembly.- The **PAR-56** lampholder assembly shall consist of the following parts: a lamp clip assembly, a housing, a mounting assembly, and a lamp connector.

3.3.1.1 Lamp clip assembly.- The lamp clip assembly, figure 2, shall secure the **PAR-56** lamp in place using a minimum of three clips. The lamp clips shall secure the lamp firmly in position with a uniform pressure at **120** degree points on the periphery of the lamp and lampholder, as shown on figure 2.

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3.3.1.2 Color filter clips.- Color filter clips, item 6 on figure 2 shall be designed in accordance with figure 1 to secure a color filter, FAA Drawing **A-4885-11**, in front of the **PAR-56** lamp. These clips shall be furnished with the lampholder. There shall be three clips spaced at **120** degrees around the lamp clip assembly.

3.3.1.3 Housing.- The housing shall consist of a shell with a mounting bracket, a shorting device, a heat shield (figure 3), and a lamp connector assembly- (figure 4). The housing weight shall not exceed 2 pounds (**0.90** kilogram (kg)). The housing shall be assembled complete with the lamp clip assembly.

3.3.1.3.1 Shell.- The housing shell shall be formed from aluminum casting **A-380**, as shown in figure 5, with space provided for a shorting device (**3.3.2**). The shell shall be able to withstand temperatures in the range of **-55** degrees C (**-67** degrees F) to **290** degrees C (**554** degrees F). A lamp indexing-ring shall be provided on the shell. The ring shall be designed to prevent the **PAR-56** lamp from being improperly installed. The shell shall retain shape and alignment under the environmental conditions specified in **3.4**. The shell shall be capable of operating continuously with a **PAR-56**, **3000watt** lamp or a **PAR-56**, **5000watt** lamp. The shell shall not deform, discolor, or show deterioration in continuous operation. All interior and exterior surfaces of the shell shall be smooth and free of pits and marks. An adjustable mounting assembly (**3.3.1.4**) shall be securely attached to the lampholder shell. Indexing marks shall be provided for aligning the shell. When the indexing mark is placed on the "0" mark on the mounting assembly, the horizontal axis of the shell shall **90 degrees ± 1/2 degree** to the vertical axis of the support. Indexing markings shall be minimum **1/32** inch (**0.79** mm) raised and **3/16** inch (**4.7** mm) long. Indexing marks shall be provided from 0 degrees to **25** degrees-above horizontal in 5 degree intervals with each 5 degrees labeled. An Underwriter Laboratory (**UL**) approved grounding lug shall be provided with the shell (figure 2) for a one conductor number **16** American Wire Gauge (**AWG**) copper grounding wire.

3.3.1.3.2 Lamp connector.- The housing lamp connector made of porcelain (figure 4) shall be rated for at least **750** watts at **20** A load current and **37.5** volts (V), **60** hertz (Hz) working voltage.- The lamp connector shall be a push-on connector matching the lamp prongs shown on FAA Drawing **C-5407-1**, with the spring-loaded socket contacts spot-welded to **copper** leads that are 6 inches (**152.4** mm) long, Number **12** American Wire Gauge (**AWG**), **600** volt **teflon** insulated, fine-strand, and concentrically wound. For lamp connectors connected to shorting devices, the lamp connector leads shall originate from the shorting devices as described in **3.3.2**. For other connectors, the lamp connector leads shall be terminated in nylon insulated male connectors that connect directly to matching female connectors of the incoming power leads. The connector contacts shall provide freedom from welding at points of contact with, the lamp under continuous duty at **20** A. The lamp connector shall provide a strain relief encompassing the conductor insulation as an integral part of the receptacle. The

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initial pull force necessary to remove a lamp prong, or a prong similar in appearance and physical characteristics to a lamp prong, from each of the connector prong sockets shall be greater than 48 ounces (weight). The temperature rise of each PAR-56 lamp connector shall be 18 degrees C or less above ambient temperature, when carrying 20 A through a test lamp prong. The test lamp prong shall be of the same dimensions, tolerances, and characteristics as described in specification FAA-E-2408, entitled: Lamps, PAR-56 Incandescent Aviation Service.

3.3.1.3.3 External service entrance.- The incoming electrical power- leads to the housing shall be through the center of the mounting assembly. The service entrance opening shall provide entrance for two 1-conductor insulated cables, No. 12 AWG, 600 V, and one No. 16 ground wire.

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- (n) Measure the wattage of the shorting devices in lampholders 1, 2, 4, and 5 with 20 A applied. Each shorting device, in the shorted state, shall load the 20 A circuit with 3 watts or less.
- (p) Turn off the 50 kW constant current regulator.
- (q) Reset shorting devices in lampholders 1, 2, 4, and 5.
- (r) Measure the insulation resistance to ground of all the shorting device leads with a 500 volt insulation tester. The minimum acceptable insulation resistance shall be 50 megohms.
- (s) Replace lamps in lampholders 1, 2, 4, and 5.
- (t) Turn on the 50kW constant current regulator to provide an 8.5 A output current to the test circuit; all lamps shall be burning.
- (u) Remove the PAR-56 lamps from lampholders 1 and 4 to simulate lamp failures; lamps 2, 3, 5, and 6 shall be burning.
- (v) Remove the PAR-56 lamps from lampholders 2 and 5 to simulate lamp failures; lamps 3 and 6 shall be burning.
- (w) Remove the PAR-56 lamps from lampholders 3 and 6 to simulate lamp failures.
- (x) Verify that the shorting devices in lampholders 3 and 6 are shorted.

4.6.4 Shorting device production unit operational test.- This test shall demonstrate that the shorting device operates with 8.5 A and 20 A circuit current. A minimum of three 5000watt PAR-56 lamps shall be installed in three lampholder assemblies, powered and connected as described in 4.6.3.. The following steps shall be exercised.

- (a) Energize the circuit with a 20 A constant current source.
- (b) Remove one PAR-56 lamp to simulate an open filament.
- (c) Turn off power to the circuit.
- (d) Reset the shorting device(s) in the lampholder assembly (ies) without the PAR-56 lamp(s).
- (e) Repeat steps (a) through (d) until one PAR-56 lamp remains in the circuit. Perform step (c), install the remaining lamp in the adjacent lampholder assembly, and repeat in sequence steps (d), (a), (c), and (d).
- (f) Reinstall all the lamps previously removed and repeat

steps (a) through (e) 10 times.

The same test shall be conducted with an $8.5 \text{ A} \pm 0.5 \text{ A}$ constant current source. Any malfunction or ~~intermittent~~ operation of the shorting devices leading to the opening of the circuit shall be cause for rejection.

4.7 Lamp connector operational test.- Five ~~5000watt~~ PAR-56 lamps shall be installed in lampholder assemblies equipped with green filters. The lampholder assemblies mounted on ~~2-inch~~ (5.08 cm) frangible couplings shall be connected in series and energized by a 20 A constant current source for a period of 720 hours. At the conclusion of the 720-hour continuous operation test, the lamp connectors shall be checked to verify that they are not welded to the PAR-56 lamp prongs. The pull force to remove a lamp prong, or a prong similar in appearance and physical characteristics to a lamp prong, from each of the connector prong sockets shall be greater than 48 ounces (weight) after the 720-hour operational test. The pull force to overcome the static friction between a prong similar to a lamp prong and each connector prong socket shall be measured at zero velocity. The pull force shall be measured on each of the connector prong sockets. The scale used to measure the pull force shall have a maximum force indication until the scale is reset. The lamp prong or similar prong shall be cleaned with alcohol and dried before each test measurement.

4.7.1 Lamp connector test.- The initial pull force to remove a lamp prong, or a prong similar to a lamp prong, from each of the connector prong sockets shall be greater than 48 ounces (weight). The method of measurement shall be as described above in 4.7.. Ten lamp connectors selected from each group of 100 connectors shall be tested for initial pull force. If any of the 10 selected lamp connectors has less than 48 ounces (weight) initial pull force, then all 100 units shall be measured for compliance with the specification.

4.7.2 Lamp connector temperature rise test.- The temperature rise of each PAR-56 lamp connector shall be 18 degrees centigrade or less when determined by measuring the difference between the ambient temperature and the lamp connector prong socket temperature with a wire test lead installed and the connector is carrying 20 amperes. The test ambient temperature shall be as specified in paragraph 3.4.1..

Construct a wire test lead by soldering a test lamp prong (the prong being of the same dimensions, tolerances, and characteristics as described in specification FAA-E-2408) onto one end of a five inch long 12 AWG wire. Insert the prong end of the test lead into one of the PAR-56 lamp connector sockets to a depth of $.5 \pm .035$ inch. Attach a thermocouple of small gauge wire (22 to 32 AWG) on to the side of the current carrying metal parts of the socket containing the prong.

--CAUTION--

The thermocouple is connected to a live circuit, therefore do not connect the thermocouple to a grounded meter.

Connect one side of the power source to the input lead of the shorting device and the other side to the other end of the test lead constructed above so as to provide a constant **20** amperes of current flow through one lamp connector socket. Temperature

measurements shall be made at **30** minute intervals until three consecutive readings establish a temperature stabilized to within plus or minus two degrees centigrade. The difference between this stabilized temperature and the ambient temperature shall not be greater than **18** degrees centigrade. Repeat the process for the other lamp connector socket.

4.8 Vibration.- The vibration test shall be conducted on six shorting devices installed in ~~PAR-56~~ lampholders (figure **12**).. At least two good lamps and two green filters shall be mounted in two of the six lampholders (i.e., lamps 2 and 5 in figure **12**).. The test circuit shall be operated at **20** A and the test assemblies shall be vibrated in the following three planes:

- (a) Perpendicular to the vibration table (vertically).
- (b) Horizontally, parallel to the light beam axis.
- (c) Horizontally, at right angles to the light beam axis (side).

4.8.1 Vibration levels.- The vibration levels are shown in table I. The duration of each sweep shall be **10** minutes. A sweep is the vibration of a unit throughout a given frequency range. Observe the two good lamps throughout the test. If one or two of the good lamps cease to operate, discontinue the test and test the lamp(s) terminals for continuity. If the lamp(s) are in good condition, the shorting device(s) is malfunctioning. If the lamp(s) are burned out, stop the test and place a new lamp in one of the lampholders. The new lamp should be burning. Continue test. If the lamp is not burning, one or more of the shorting devices is malfunctioning. Any malfunction of the shorting device(s) shall be cause for rejection.

4.9 Aiming device test.- The contractor shall provide an aiming platform for mounting the lampholder assembly and for testing each aiming device. The platform shall be calibrated to the same tolerances specified for **the aiming device and shall** permit verification of the angular readings taken from the mounted aiming device from 0 degrees to **25** degrees in 2 degree increments.

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Specification

PAR-56 LAMPHOLDER